

Exploring the impact of Shared Domain Knowledge on Strategic Alignment in the Australian Public Sector

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Abstract—In this age of ever-increasing information technology (IT) driven environments, governments/or public sector organisations (PSOs) are expected to demonstrate the business value of the investment in IT and take advantage of the opportunities offered by technological advancements. Strategic alignment (SA) emerged as a mechanism to bridge the gap between business and IT missions, objectives, and plans in order to ensure value optimisation from investment in IT and enhance organisational performance. However, achieving and sustaining SA remains a challenge requiring even more agility nowadays to keep up with turbulent organisational environments. The shared domain knowledge (SDK) between the IT department and other diverse organisational groups is considered as one of the factors influencing the successful implementation of SA. However, SDK in PSOs has received relatively little empirical attention. This paper presents findings from a study which investigated the influence of SDK on SA within organisations in the Australian public sector. The developed research model examined the relationship of SDK between business and IT domains with SA using a survey of 56 public sector professionals and executives. A key research contribution is the empirical demonstration that increasing levels of SDK between IT and business groups leads to increased SA.

Keywords—Shared domain knowledge, Strategic alignment, Public sector, Business objectives, IT processes

I. INTRODUCTION

The use of information technology in business has transformed over the last decade from what was perceived as an operational utility to that of a competitive weapon today [1]. This phenomenon has affected the way public and private organisations are managed [2] as well as the way IT affects the strategic activities of these organisations [3]. However, organisations continue to employ IT as a service provider in isolation from the business while expecting to realise the full benefits of their investments in it [4]. While IT is enabling and causing changes that are substantive, it is becoming infeasible to have a ‘disconnect’ between an organisation’s strategic goals and plans, and its IT initiatives and management [5]. IT and business units must view each other as strategic partners and jointly create vision, strategies, and measures of success and value within organisations [6]. Strategic alignment (SA),

which involves “applying information technology (IT) in an appropriate and timely way, in harmony with business strategies, goals, and needs” [3], has been identified as one of the most critical issues facing academic researchers [7] and has been among the top five challenges faced by senior executives over the last decade [8] and continues to be of increasing importance today. This is caused by the noticeable improvement SA brings to IT initiatives and overall organisational performance [9]. In public sector organisations (PSOs), successfully achieving SA is expected to “assist public sector organisations and governments in aligning their various organisational transformation initiatives with counterpart technology-related initiatives.” [10] Despite the recognition of the importance of SA, insufficient research exists on how to achieve and sustain SA in PSOs. Accordingly, there is support in the literature for studying the factors affecting SA [11].

Some of the issues that impede achieving SA revolves around shared domain knowledge (SDK) between the business and IT domains [12] as SDK is considered one of the influential factors to the successful creation and execution of long and short-term SA [6, 13]. There is considerable evidence that suggests that SDK is a major contributor to the successful utilisation of IT resources in the support of business objectives and as a result improve SA levels [14]. Thus, the collaboration between IT personnel and other business staff at all levels of an organisation is considered a prerequisite for high levels of SA.

However, exploring effective ways for achieving and sustaining SA in PSOs through SDK remains a challenge requiring more research to address what is still considered a major concern for executives [15]. While many relevant factors are important in achieving high levels of SA, the focus of the study reported here is solely on understanding the influence of shared domain knowledge on strategic alignment.

II. BACKGROUND

A. Business-IT Strategic Alignment

Strategic alignment (SA) between business objectives and IT initiatives more than just aligning the operations of IT with

business activities; it involves alignment of a defined set of strategic objectives as well as the design and management of IT resources in accordance with the organisation's goals and strategies. SA is defined as "the degree to which the IT mission, objectives and plans support and are supported by, the business mission, objectives and plans." [6], and is achieved through establishing synergies between business-IT plans, and strengthening communications between business-IT executives. Furthermore, SA is fostered through the involvement of IT managers in the business planning process to ensure that IT plans echo business plans [13].

SA maximises the potential return on IT investments when it attracts active participation from the top echelon if pursued as an approach for enabling IT to work for and with business [16]. Besides, the successful use of IT resources calls for specifying SA requirements at the initial design phase to ensure the appropriate level of management involvement [17]. Moreover, the successful integration between IT and business strategies ensures that IT is viewed as a strategic partner instead of a service provider to wider organisational outcomes. Table I depicts a number of aspects of the benefits of integration [18]. Thus, executives must plan, integrate, and execute business and IT strategies based on the organisation's goals in order for IT investments to deliver value to the business.

TABLE I. IT AS A SERVICE PROVIDER OR AS A STRATEGIC PARTNER [18]

IT as a Service Provider	IT as a Strategic Partner
IT is for efficiency	IT is for business growth
Budgets are driven by external benchmarks	Budgets are driven by business strategy
IT is separable from the business	IT is inseparable from the business
IT is seen as an expense to control	IT is seen as an investment to manage
IT managers are technical experts	IT managers are business problem solvers

B. Enablers and Inhibitors of Strategic alignment

It is evident that implementing SA within the government has been a challenging task partially because IT expenditure in PSOs continues to rise [19] but mainly due to a range of factors that might hinder successful implementation, such as communication barriers, the invisibility of the IT staff, attitudes of organisation members to IT, history of IT/business relationships, shared domain knowledge, and leadership [20]. Factors affecting the successful implementation of SA could be categorised into two main streams: enablers or inhibitors. Enablers are events that lead to higher level of SA and when present reinforce successful implementation, such as: senior executive support for IT, IT involvement in strategy development, IT understanding of the business, and Business-IT partnership [21]. Factors that can hinder SA include: lack of business-IT relationship and communication, failure of IT projects to deliver business value, and lack of senior executives commitment to IT [21]. The main themes emerging so far focus on connections and communication between

business-IT, history of IT implementations, and knowledge [6]. It seems logical therefore to maximise enablers and minimise inhibitors to effective implementation of SA.

1) Connections between business-IT planning

SA is strengthened through establishing a strong connection between business-IT planning processes as the participation of IT executives in the business planning process is reported to lead to better understanding of the organisation's objectives [22]. In addition, structural mechanisms (e.g., steering committees) are thought to build a solid business-IT partnerships, which make the successful introduction of new IT initiatives possible [23].

2) Communication between business-IT executives

There is sufficient evidence to indicate that communication leads to improved SA through the development of mutual understanding, interaction and exchange between IT and line managers [24]. In most cases, communication ensures that information is created and shared between individuals to reach a mutual understanding, which in turn enable the effective integration of business and IT capabilities [6, 25].

3) Previous implementation of IT plans/projects

A successful track record of IT contribution to the business is expected to improve business-IT relationships; increase the communication between business and IT executives; and foster considering IT in business planning [25]. On the other hand, previous failures of IT are likely to reduce the level of communication, cooperation, trust, and support, which leads to fragile working relationships between business and IT executives [26].

4) Shared domain knowledge (SDK)

SDK is defined as "the ability of IT and business executives, at a deep level, to understand and be able to participate in the others' key processes and to respect each other's unique contribution and challenges." [6] Effective SDK can be viewed as a synergy between groups that establishes mutual understanding between organisational subunits -or groups- (i.e., business and IT) and is considered different from pure information [27]. Two dimensions of SDK have been identified as IT managers' knowledge of business and business executives' knowledge of IT [13] and are defined as "the knowledge that the IT manager possesses about the business process, the knowledge that the business manager possesses about the potential opportunities to apply IT to improve business process, and the common understanding between the IT and the line manager regarding how IT can be used to improve business process performance." [28] SDK assists organisations to improve communication [29], increase innovation [30], enhance IT performance [6], and achieve better linkages between objectives and actions [6]. SDK influences and is influenced by IT/business executive relationships [31], and is found to facilitate short-term and long-term alignment [6]. In contrast, the lack of SDK was found to hinder SA [32]. As a result, SDK has drawn much attention within SA research [32].

Despite the criticality of strategic alignment between business-IT, little evidence exists of attempts having been

made to explore the factors (enablers or inhibitors) that influence SA in public sector organisations. There is a plethora of research papers in literature about SA that are concerned with the outcome of integration between business and IT [33] or the relationship between SA and IT performance [8], however there is insufficient empirical investigation of the relationships between factors and SA, in particular SDK [34]. As a result, this paper addresses this limitation by investigating the influence of SDK on SA within PSOs in Australia.

III. RESEARCH METHODOLOGY

This research has an exploratory focus and draws on a survey of key informants from the Australian public sector to provide information about the level of IT and business knowledge, and SA levels in PSOs. Participants with at least 3-5 years of experience in IT or business and public administration were chosen as key informants to reduce the number of informants required and ensure a more reliable source of information.

The conceptual hypotheses and hierarchical relationships of three constructs examined in this paper (i.e., Business objectives knowledge, IT processes knowledge, and SA) is presented in the analytical model (see Fig. 1). Each of the constructs correlated to items on the data collection instrument (i.e., questionnaire).

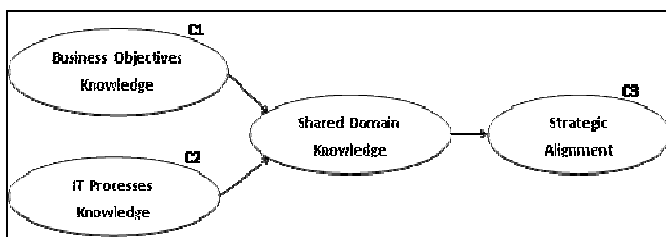


Fig. 1. Analytical Framework

Definitions and measurable indicators (or variables) of these constructs were found in literature, however; the operationalisation of these indicators was not specific to the relationship examined in this paper (i.e., SDK-SA). Instead of adopting these broader variables, 22 field-driven items were developed. The first construct (C1), business objectives knowledge, was conceptualised as the aggregate of two variables: experience in public administration (V1) and familiarity with business objectives within the surveyed organisation (V2).

The second construct (C2), IT processes knowledge, was operationalised using two variables: experience in IT governance (V3) and familiarity with IT processes within the surveyed organisation (V4). A prerequisite of 3-5 years of experience was established for V1 and V3, whereas V2 and V4 were assessed on a five point Likert-type scale. As V1 and V3 were established prior to data collection and therefore did not require measuring, only V2 and V4 were measured using the data collecting instrument to indicate the level of business

objectives knowledge and IT processes knowledge of each respondent.

The third construct (C3), strategic alignment, was measured by utilising high-level processes from the COBIT 5 framework as it is a reliable source for assessing IT governance and business /IT alignment [35]. The latest version, COBIT 5, divides the governance of IT into five domains: Evaluate, Direct and Monitor (EDM); Align, Plan and Organise (APO); Build, Acquire and Implement (BAI); Deliver, Service and Support (DSS); and Monitor, Evaluate and Assess (MEA), which are broken into 37 high-level processes [36]. As a result, and judging by the nature of each of the COBIT 5 domains, the EDM (V5-V9) and APO (V10-V22) domains were used as measurable indicators of strategic alignment.

The relationships that this paper aims to investigate (i.e., SDK association with SA) is presented in the theoretical model (see Fig. 2) where the lines connecting constructs symbolise the hypotheses that will be statistically tested. The model has been designed to examine two hypotheses:

H1. The knowledge of business objectives correlates with the SA

H2. The knowledge of IT processes correlates with the SA

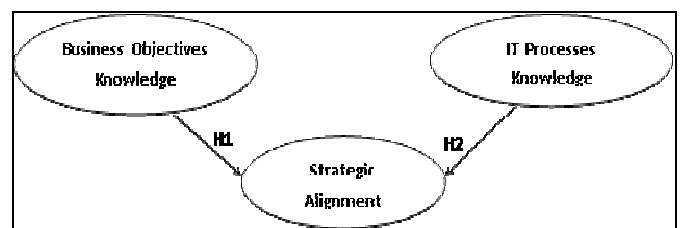


Fig. 2. Theoretical model

Data collection was performed as a cross-sectional field study from the public sector population shortly after a pilot test of the questionnaire was administered to five thought leaders from the Queensland public sector. Based on their feedback, no further amendments were required to the developed instrument. The survey included participants drawn from three different representative groups to limit any sample frame bias. Moreover, to reduce the possibility of single-source bias that might result from exaggeration or self-promotion and to encourage participation, the respondents were assured that the results would be completely anonymous and that they would receive a summary of the study findings. From 112 email invitations, 56 were deemed usable responses (i.e., 50% response rate). Analysis of nonresponse bias was performed by comparing early and late responses [37]. As t-tests of the mean differences for each of the constructs and number of respondents failed to demonstrate any significant differences ($p < 0.05$, two-tailed), nonresponse bias was not considered an issue in this study.

IV. RESULTS AND ANALYSIS

Analysis of descriptive statistics was undertaken to search for possible affects or bias resulting from certain patterns in

the sample data. Table II displays the role of the respondents and the frequency that this role appeared. The role is important in this research as the goal was to capture perceptions from respondents at different levels within PSOs.

Internal consistency analyses of the Likert-type scales were measured using Cronbach's Alpha reliability coefficient as it relates to the measurement of the internal consistency and homogeneity of items in a scale [38]. The result was significant for all items in the questionnaire at (Cronbach's alpha > 0.7). Kaiser Meyer Olkin (KMO) and Barlett tests were employed to measure construct validity as the former is used to assess the adequacy of the sample magnitude for factor analysis while the latter test is used to determine whether the data come from multivariate and normal distribution [39]. For this study, the KMO value was 0.89 indicating sampling adequacy, and the Bartlett's test result was significant at 1256.7 ($P < 0.05$). Confirmatory factor analysis (CFA) for convergent and divergent validity could not be performed on such low sample size as the minimum sample recommended for conducting such analysis should be at least 100 [40].

TABLE II. ROLE DISTRIBUTION

Role	Count
Executive/Manager	26
Junior/Operational Officer	30
Total	56

The Spearman's rank correlation co-efficient was conducted to establish variable correlation since it is a non-parametric correlation suited for small sample sizes where a normal distribution is difficult to be assumed [39].

Based on the p-value in Table III no results are significant, therefore; no null hypotheses can be rejected. H2 has moderately a stronger positive correlation based on the Spearman's rank ($R=0.21$) whereas H1 has a weaker positive correlation ($R=0.19$).

TABLE III. DESCRIPTIVE STATISTICS

Hypotheses	N	R	T(N-2)	p-value
H1	55	0.19	1.35	0.18
H2	55	0.21	0.80	0.43

V. DISCUSSION

The results indicate that a direct relation between shared domain knowledge and strategic alignment could be established. According to the results of the construct measurements (i.e., V1-22), mutual understanding between the business and IT domains may create improved SA in public sector organisations as both correlations of SDK (i.e., business objectives knowledge and IT processes knowledge) were relatively positive. However, the low values of the Spearman's Correlation suggest that the level of SA may depend on other factors as well, perhaps more than SDK. For instance,

knowledge of IT Governance was found to improve the perceived level of SA.

Based on the number of variables where the average scores were greater than the mean, it was observed that executives/managers placed higher emphasis on stakeholder management and perceived operational areas (e.g., security) as less important. Similarly, junior/operational officers perceived risk management as more important than benefits delivery and managing innovation. This indicates that junior staff members have a higher understanding of IT processes and risk management in PSOs while executives on the other hand have a better understanding of enabling business objectives to meet stakeholders' needs.

As illustrated in Fig. 3, the business objectives knowledge rating for executives/managers was higher than their rating of IT processes knowledge, whereas; the IT processes knowledge rating for junior participants was higher than their rating of business objectives knowledge. Consequently, IT knowledgeable business executives and business savvy operational/IT staff are expected to optimise SA in PSOs through regular communication to bridge this identified knowledge gap between executives and junior/operational staff.

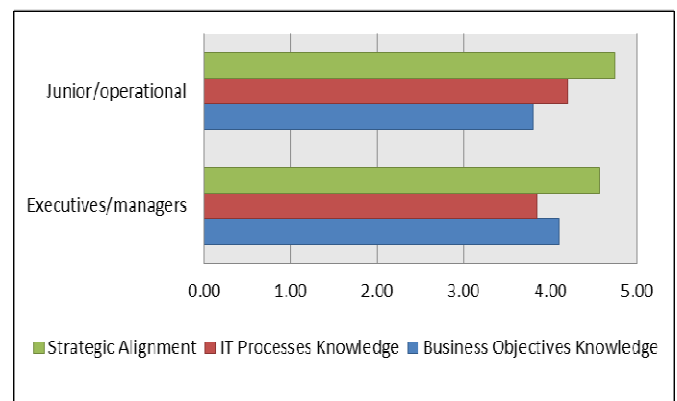


Fig. 3. SDK and SA breakdown based on role

The results suggest that the rating of SDK has a positive relation with the rating of SA. For instance, the SDK rating for junior/operational staff was higher than the one for executives/managers, and subsequently their SA rating was also higher. Thus, staff at all levels should invest in identifying capabilities for business and IT to interconnect, which as a result could improve SDK and SA. Academics on the other hand are urged to extend the understanding of SDK by testing the individual constructs identified in this paper using a larger sample sizes to refine the exploratory results; explore the applicability of results on non-public sector organisations; and explore alternative measurable indicators/variables for SA and SDK.

VI. CONCLUSION

This research contributes to an overall conceptual understanding of the importance of shared domain knowledge as a factor for improving strategic alignment. Enabling IT

managers to grow into business savvies and assisting business executives to develop IT governance/processes knowledge is the main focus of SDK. Improving business-IT synergies through SDK in public sector organisations is turning into a necessity due to growing demands and reduced resources available. Based on the results, it appears as though, achieving high levels of SDK within PSOs could potentially result in optimising SA between business – IT. Consequently, in order to improve SA, IT and business staff at different organisational levels should have adequate knowledge about business objectives and IT processes respectively. Furthermore, according to the strong correlation found in this research, improving executives' knowledge of IT processes/governance is expected to enhance SA. In order for SDK to thrive in organisations, actions such as physically moving IT staff into business units, planning shared workshops and brainstorming sessions, and sending IT staff on regular visits to frontline offices may be required. Other methods may also include rotating business managers through IT roles to reinforce the message that IT is an integral part of the business.

IT personnel need to be skilled in the softer side of business which often does not go hand-in-hand with the technological focus that IT professionals, historically, tend to have. Top management buy-in, proactive CIOs, and socially skillful IT professionals are vital for making SA a cultural phenomenon.

Research points to the conclusion that SA is contingent on, amongst other factors, the existence of SDK between business and IT. Improving SDK within PSOs like any other core competency takes time to develop, therefore; IT managers and business executives need a clear roadmap to build and maintain these capabilities.

VII. LIMITATION AND FUTURE RESEARCH

One of the main limitations of this study is the reliance on a limited number of informants and perceptual data which was the reason of a limited sample size. However, the effect of such limitation was reduced by engaging IT and business professionals with experience in public sector administration and by designing the questionnaire to mitigate self-reporting bias. The second limitation lays in the exclusion of environmental factors as only two contextual variables were included to manage the scope of the study, namely: experience in public administration and exposure to the IT governance function. Environmental factors might have affected the SA complexity, for example, changes in regulatory environment, unique organisational characteristics, and shifting political powers. The third limitation relates to the conceptualisation of SA, which was viewed as a single construct and was measured based on two domains from the COBIT 5 framework, implicitly assuming that IT operational and tactical management were represented in the other three domains. This assumption was made to keep the study manageable but different IT governance and management activities may be overlapping in these five domains to varying extents. Future studies could include a more comprehensive conceptualisation

and operationalisation of SA that better reflects its multi-dimensional nature. Another limitation relates to the generalisability of results as this study was performed within the public sector environment that was in a state of flux with budgets coming under pressure and departments trying to respond to change in the political environment. Hence, a study done in a stable environment may produce slightly different results.

This study suggests several implications for future research. First, in line with previous research [e.g.,41], external factors (e.g., IT processes/governance) have less effect on SA than internal factors (e.g., business objectives/governance). Thus, a possible direction for this research stream is to evaluate if SDK is only necessary for internal evaluations. Second, as this paper theoretically and empirically linked knowledge considerations to SA, it is expected that there are undiscovered recursive relationships and that there are more factors that will predict SA. Therefore, further research could utilise larger surveys to explore these more complex relationships. Third, this paper supports the critical role of SA in deriving value from IT investments and highlights the mediating role of SDK in PSOs. Future research could examine if SDK indirectly improves other aspects of IT. Finally, it is suggested that further research investigate whether the results are reproduced in other contexts (e.g., private sector) and also study alternative factors (e.g., changing political environments) that might facilitate or inhibit SDK and subsequently influence SA.

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